

of the geological record; and, unluckily for the genealogy of man, the very chapter we most need, that of the Worms and primitive Tunicata, is the one most hopelessly lost.

All this does not prove that no attempt should be made to trace back the descent of man and other animals by such lights as we have, but it does seem to show that the results are too uncertain to be set forth as ascertained facts in popular lectures.

Strange as it now seems, a generation ago many of the best zoologists spent their time in arranging animals according to various systems of metaphysical origin. The speculations of Oken and Geoffrey St. Hilaire, of Forbes and Macleay, read now like the controversies of the schoolmen. The archetypal skeleton was drawn in many forms (and often in several colours), and almost as many compound terms were invented as those of Prof. Hæckel; but all these fancied systems have passed away, or only exist as relics to encumber the ground. Does not their fate suggest misgivings as to the fate of the genealogical trees which are now so luxuriant?

In conclusion I will quote the words of one who will not be suspected of sharing the prejudices of those ecclesiastical newspapers which appear to be responsible for many of the defects in Prof. Hæckel's lectures.

"Of all kinds of dogmatism the materialistic is the most dangerous, because it denies its own dogmatism, and appears in the garb of science; because it professes to rest on fact, when it is but speculation; and because it attempts to annex territories to the domain of Natural Science before they have been fairly conquered."\*

P. H. PYE-SMITH

### ISMAILIÄ

*Ismailia: a Narrative of the Expedition to Central Africa for the suppression of the Slave Trade, organised by Ismael, Khedive of Egypt.* By Sir Samuel W. Baker, Pacha, F.R.S., &c. &c. Two vols. (London: Macmillan and Co., 1874.)

IT must be difficult for any unhardened critic to keep his wits about him in reading this fascinating narrative, and we are sure no reader will wish that it had been shorter.

There is not much in the book of directly scientific interest. Sir Samuel went over very nearly the ground he had traversed before, and which he has so well and fully described in his "Albert N'yanza" and "Nile Tributaries of Abyssinia;" and he kept so faithfully and unswervingly in view the noble errand on which he set out, that he had little opportunity to attend to the interests of science. The heroic Lady Baker, however, made large botanical collections throughout the journey, which she presented to the Khedive on her arrival in Cairo, and Sir Samuel informs us that Lieut. Baker made considerable topographical observations. Moreover, although the expedition had no scientific object in view, its purpose was eminently conducive to the interests of

science, seeing that until the demoralising traffic in slaves is suppressed, we can never hope to obtain a thorough knowledge of the interesting region around the Upper Nile—of its geography, its ethnology, and its natural history; and therefore, although the great object which Baker had in view seems to have been thwarted through the pusillanimity of the Egyptian Government, he deserves the greatest credit for having proved that with skill, determination, and adequate means—and his means were very inadequate—the journey from Cairo to the Albert N'yanza might be accomplished in a very short time.

We think it would be difficult to conceive of a leader better fitted than Sir Samuel Baker to accomplish the task which the Khedive commissioned him to do. His work is a practical commentary on the vigorous and truthful lines of Tennyson:—

"O well for him whose will is strong!  
He suffers, but he will not suffer long;  
He suffers, but he cannot suffer wrong:  
For him nor moves the loud world's random mock,  
Nor all calamity's hugest waves confound,  
Who seems a promontory of rock,  
That, compass'd round with turbulent sound,  
In middle ocean meets the surging shock,  
Tempest-buffed, citadel-crown'd."

Sir Samuel estimates that at least 50,000 persons are annually captured to be sold as slaves, and it would be safe to say that several thousands more are massacred in effecting the capture of these; the atrocities practised by the slave-hunters are almost incredible. It was to suppress this lamentable state of matters that Sir Samuel Baker was commissioned, on April 1, 1869, by the well-intentioned and enlightened Khedive of Egypt, who gave him full powers as to equipment. To accomplish this purpose it was necessary to annex the whole Nile basin, and to establish a legitimate trade in the barbarous countries which had hitherto been scourged with this infamous traffic. So far as Sir Samuel could carry out his plans, the equipment of the expedition was admirable in every detail, down to the magic lantern, the wheels of life, and the magnetic battery, which last was in constant requisition among the tribes of the Upper Nile, and was a perpetual source of amusement to the members of the expedition and of wonder to the natives.

It would be impossible, in the space at our disposal, to give any adequate idea of the work of the expedition. From the very first Sir Samuel met with obstructions and delays that would have induced any less patient and less determined man to abandon it altogether. The Egyptian Government had undertaken to furnish a large number of boats, besides steamers and an adequate military force, for the expedition, which, it was arranged, would start in June 1869. It was with the greatest difficulty that a start was made on the 29th of August, when two of the parties proceeded up the Nile, one to go direct by river to Khartoum, and the other to land at Korosko and march across 400 miles of desert to the same place; with the latter was the heavy machinery and sections of steamers carried by a regiment of camels. Sir Samuel himself set out from Suez on Dec. 11 for Souakim, thence to Berber on the Nile, and in a diabbeeah to Khartoum. Here, in accordance with orders which had been sent on months before, he expected a fleet of vessels to be ready

\* I have endeavoured to represent the sense of the following passage from Virchow ("Gesammelte Abhandlungen," p. 18):—"Es giebt einen materialistischen Dogmatismus so gut wie einen kirchlichen und einen idealischen, und ich gestehe gern zu dass der eine wie die anderen reele Objecte haben können. Allein sicherlich ist der materialistische der gefährlichere weil u. s. w."

to convey the expedition up the Nile, but was coolly informed by the Governor-General that "it was impossible to procure the number of vessels required; therefore he had purchased a house for me, as he expected I should remain that year at Khartoum, and start in the following season."

This was certainly disheartening; it was evident that the expedition was unpopular, and that although the Khedive earnestly wished the suppression of the trade, there was scarcely another man in the country but thought it was his interest to support it; thus the queller of the evil had to fight against tremendous odds. After inconceivable difficulty a small fleet was got together, a force of 1,400 infantry and two batteries of artillery mustered, and everything ready for a start by Feb. 8, 1870, although the desert party under Mr. Higginbotham had not yet come up. Out of the military force, Baker selected forty-six men, who were known as the "Forty Thieves," owing to their light-fingered propensity, of which, however, they were soon cured, and became ultimately a loyal band of well-disciplined braves, who contributed greatly to the success of the expedition.

On Feb. 16 the expedition reached the Sobat junction, which river brings an immense body of yellowish water to the Nile, colouring the latter for a great distance. The Bahr Giraffe was reached next day, and here the expedition met with new difficulties which seemed likely enough to compel it to turn back. Sir Samuel says—

"The Bahr Giraffe was to be our new passage instead of the original White Nile. That river, which had become so curiously obstructed by masses of vegetation that had formed a solid dam, already described by me in 'The Albert N'yanza,' had been entirely neglected by the Egyptian authorities. In consequence of this neglect an extraordinary change had taken place. The immense number of floating islands which are constantly passing down the stream of the White Nile had no exit; thus they were sucked under the original obstruction by the force of the stream, which passed through some mysterious channel, until the subterranean passage became choked with a wondrous accumulation of vegetable matter. The entire river became a marsh, beneath which, by the great pressure of water, the stream oozed through innumerable small channels. In fact, the White Nile had disappeared. A vessel arriving from Khartoum in her passage to Gondokoro would find, after passing through a broad river of clear water, that her bow would suddenly strike against a bank of solid compressed vegetation—this was the natural dam that had been formed to an unknown extent: the river ceased to exist.

"It may readily be imagined that a dense spongy mass which completely closed the river would act as a filter: thus, as the water charged with muddy particles arrived at the dam where the stream was suddenly checked, it would deposit all impurities as it oozed and percolated slowly through the tangled but compressed mass of vegetation. This deposit quickly created mud-banks and shoals, which effectually blocked the original bed of the river. The reedy vegetation of the country immediately took root upon these favourable conditions, and the rapid effect in a tropical climate may be imagined. That which had been the river bed was converted into a solid marsh.

"This terrible accumulation had been increasing for five or six years, therefore it was impossible to ascertain or even speculate upon the distance to which it might extend. The slave-traders had been obliged to seek another route, which they had found *via* the Bahr Giraffe, which river had proved to be merely a branch of the White Nile, as I

had suggested in my former work, and not an independent river."

On Feb. 18 the fleet commenced to push its way against the strong current of the Bahr Giraffe, but had not made much progress when it was met by obstructions which had shut up the original channel; day after day was the river found to be choked up with a mass of vegetation—"sudd," Sir Samuel calls it—which with infinite labour had to be cleared away by all hands working with cutlasses and knives, to allow the vessel to pass through. The cutting through of this was dreadfully trying to the men; the poisonous effluvia permanently disabled many; it was, besides, a sore hindrance to the progress of the expedition. The end of it was that Sir Samuel was compelled to turn back and wait for a more favourable season when the river would be in stronger volume. The retreat was commenced on April 3. The distinguishing feature of the country at this part of the Bahr Giraffe is the innumerable hills of the white ant, rising to heights of 8 and 10 ft., and numerous herds of the antelope *Damalis senegalensis* are met with.

A very well-organised encampment was formed some distance below the Sobat junction, which ultimately developed into a pretty town and busy market-place, to which Sir Samuel gave the name of "Tewfikkeyah."

A start was again made on Dec. 11, and after scarcely less labour, which disheartened and told on the health of nearly everyone but Baker himself, who seems throughout to have had a charmed life, the broad bosom of the great White Nile was reached on March 11, 1871, and the fleet arrived at Gondokoro on April 15, having taken twenty months to do what on Sir Samuel's return journey was easily accomplished in three. The powers of Baker Pacha were by his commission to expire in four years from April 1869, so that he had now only two years in which to accomplish the great purpose of his mission. He had not, however, been idle on his route from Khartoum to Gondokoro, as by various means he had managed to inspire the slavehunters with a wholesome fear of himself, and had liberated several cargoes of slaves, to the great astonishment of the poor wretches themselves.

Sir Samuel found a great change in the river since his previous visit. The old channel was choked with sand-banks, new islands had been formed in many places, and it was impossible for the vessels to approach the old landing-place. The country around had, moreover, been swept of villages and inhabitants, who had been driven for refuge on the numerous low islands of the river. All that remained of the old mission station of the Austrian missionaries was an avenue of large lemon-trees. Sir Samuel landed a little below the site of Gondokoro, and lost no time in making himself and his companions as comfortable as circumstances would permit, forming a large encampment, and instituting an extensive system of cultivation. Indeed, wherever he went he attempted to instil a love of agriculture among the natives, as he did among his own people, giving away large quantities of seeds, accompanying the gifts with instruction as to the enormous benefits to be derived from cultivation. But his troubles multiplied upon him. He found the Baris, whose tribes occupy most of the district around his station, while professing the greatest friendliness, utterly hostile to the objects of the expedition; their minds had been

poisoned against him by the machinations of the demoniacal Abou Saood, the representative of the great slaving firm of Agad & Co. of Khartoum, who had obtained from the Governor-General of Soudan a monopoly of the trade of all the Upper Nile district, extending over an area of 90,000 square miles. The great majority of his own officers and men, moreover, he found to be hostile to the purpose of the expedition, some of them being even secretly in league with the slave-traders. It was only by the exercise of rigid discipline and almost superhuman patience that between the hostile and treacherous tribes around and the "foes of his own house," the whole expedition did not fall to pieces. He was at last compelled in self-defence to fight the native tribes, and one

cannot but be struck with admiration at the skill with which he, with a handful of men—and the "Forty Thieves" were the only soldiers he could really depend upon—managed to keep his myriad enemies at bay. Happily he did ultimately succeed in convincing the natives that his intentions were earnest and disinterested, and before his return north he did succeed in thwarting the machinations of his great enemy Abou Saood, and clearing the country for many miles around his route of the slave-hunting brigands.

In January 1872 Sir Samuel started southwards with a small force of only about 200 officers and men; for the 1,200 with which he arrived at Gondokoro had by sickness, death, and desertion dwindled down to 500, 300 of



Arrival at the Stoppage—The *Baleniceps rex*.

whom he had to leave behind him to garrison Gondokoro. Amid incredible difficulties, the small force reached Fatiko in the beginning of February. Fatiko is on the third parallel N., about seventy miles east of the head of the Albert N'yanza. After a short stay here, Sir Samuel, leaving half of his men behind, marched southwards to Unyoro, the capital of which, Masindi, he reached after disheartening delays and treacheries and equivocations on the part of the native chiefs, on April 25, 1872. The king of the district was Kabba Réga, a son of Baker's wily old friend Kamrasi. He turned out to be a treacherous, greedy, drunken, utterly irreclaimable "young cub," who under the influence of Abou Saood did his best to crumple up the small party which had entrusted themselves to his mercy. Sir Samuel at this, the southern

limit of his journey, did his best to plant the seeds of civilisation and a healthy commerce, but we fear succeeded in making little impression on the besotted Kabba Réga, who in the end, we are glad to find, was beaten by his well-intentioned brother Rionga, with the assistance of Sir Samuel. Here the latter endeavoured to obtain news of and to communicate with Livingstone by means of emissaries from M'Tese's country and other districts to the southward; and here he obtained reports which tended to confirm his conjecture that the Albert N'yanza extends south to a great distance, and communicates with Tanganyika. Sir Samuel, in his map, has filled in many names of tribes between the two N'yanzas, and we hope that the result of his expedition will be the more thorough exploration of this interesting district.

At last the determined and cowardly hostility of Kabba Réga and the thousands at his command became so unmistakable and dangerous, that after exercising astonishing forbearance and withstanding bravely several attempts at destruction, the handful of men, having set fire to all their property and their pretty little station, started on their march back to Foweera, the headquarters of Rionga, on June 14, 1872. This march of about fifty miles, we are sure, is unparalleled in history. It was mostly through thick grass reaching far above the head, through a continuous ambuscade of thousands of savage enemies, who kept up an almost continuous shower of spears within a few yards on each side of the short line of weak, hungry, but courageous men, who, notwithstanding, managed to reach Foweera with comparatively little loss. The brave Lady Baker performed most of the journey on foot, and Sir Samuel in the end pays a just tribute to his noble wife, who in many ways showed herself the ever-watchful good genius of the expedition.

We have only space to say further that Gondokoro was reached on April 1, 1873, when Sir Samuel found that his Englishmen had built a beautiful little steamer, and that the engineer, Edwin Higginbotham, was dead. Arrangements having been made to maintain Gondokoro as a station, Sir Samuel started homeward in the new steamer *Khedive* on the 25th of May, and after a swift and easy passage, reached Khartoum on June 29 and Cairo on August 24. Here the Khedive received Sir Samuel and his companions with well-merited honours, although we regret to say that he seems to have been powerless to act with the uncompromising decisiveness necessary to complete what Sir Samuel had so well begun. The latter had rid nearly the whole of the district through which the expedition journeyed, of the iniquitous slave-hunters, and justly expected that an end would have been put to the wickedness of the inhuman Abou Saood. The final sentence of the narrative is almost crushing:—"After my departure from Egypt, Abou Saood was released and was appointed assistant to my successor." We can only hope that this may not turn out so disastrous as it seems, but that Colonel Gordon may succeed, in spite of this suspicious companionship, in completing the work which it cost Sir Samuel and his party so much trouble to initiate.

One shuts the book with but a low idea of the natives whom the courageous Englishman tried to benefit; it would seem as if they had no single characteristically human quality which could be appealed to and used as a basis on which to rear the virtues of civilisation; and one is very much inclined to believe with Sir Samuel that some modification of the method which he found so successful in training the "Forty Thieves" might be more likely to succeed in raising these Africans from their slough than any appeal to their moral natures.

#### LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

##### Endowment of Research

IN the article on "Endowment of Research," in NATURE, vol. xi. p. 2, the following passage occurs:—

"It does not appear from the Report of the Commission that the Cambridge Colleges have yet taken any steps to appropriate definitely any portion of their endowments to the encouragement of scientific research; but it is a matter of common notoriety that at the October election to Fellowships at Trinity College, a candidate was successful whose chief qualification was that he had already accomplished good original work in embryological investigation."

Although it may not appear in the Report, it is nevertheless the fact, that in December 1872 the Master and Fellows of Trinity adopted a revised set of statutes, wherein are distinct provisions for the endowment of research, very like those commended in the case of New College, Oxford. The Privy Council has, however, deferred since January 1873 the consideration of these statutes, until the late Commission should have reported. This delay seems now all the more vexatious and unjustifiable, inasmuch as it appears from the Appendix to the Report, that changes of statutes were proposed at Oriel and New Colleges five months after the date of our proposal, and that these changes were ratified by the Privy Council within a few months in the ordinary manner.

If in the future the Government should desire to make any changes in this direction in the constitutions of the Colleges, it should be remembered to the credit of this College that two years ago a complete scheme was offered which made liberal provision for the endowment of research. It is due to external authority alone, that in the meanwhile vested interests have accrued, far heavier than any which would have arisen under the proposed statutes, and that nearly one-third of the University has been prevented from enjoying during the interval, statutes in accordance with the prevailing opinion inside, and certainly, as to scientific research, meeting with the approval of the outside world.

GEORGE DARWIN

Trinity College, Cambridge, Nov. 8

#### The University of London

IN justice to the graduates of the University of London and to the Annual Committee of Convocation, I trust you will allow me to offer a few remarks with respect to Prof. Foster's opening address delivered at University College and published in your columns, vol. x. pp. 506 and 525.

Prof. Foster very justly complains that in the present regulations for the Matriculation Natural Philosophy Examination there is not "a tittle of internal evidence to show that they were drawn up in the present century," that there is a want of connection between the subjects required from candidates, and that the freedom of teachers in the instruction of their pupils is seriously interfered with, by the necessity of adapting lectures to the requirements of the examination.

None have shown themselves more sensible of the justice of these views than the graduates of the University; and, in a report which was drawn up by a sub-committee and adopted by Convocation, with reference to certain proposed modifications of the matriculation, the attention of the Senate was respectfully called to this portion of the examination. That report states:—"Your committee are strongly of opinion that no revision of the matriculation examination would be satisfactory which did not effect some improvement in that part of it which relates to Natural Philosophy. In proposing the following alterations, their objects have been to adapt this examination to the courses of lectures and to the most approved text-books on Physics."

It will be seen from this extract that Convocation was desirous that the examination should be brought into harmony with the best methods of instruction, and that the greatest possible freedom should be left to teachers. It was further suggested that the subjects of examination should include Mechanics, Hydrostatics, Heat, and Light, and that the first only of these subjects should be compulsory.

In the new regulations issued by the Senate, which will come into operation in June 1875, some improvements in this examination have been effected. The antiquated syllabus of subjects has been retained, but the whole character of the examination has been modified. Heat has been introduced; and it has been resolved that in the Natural Philosophy paper double as many questions shall be set as are required to be answered, and that candidates shall be free to choose any of them up to the required number. This alteration will effect a great improvement on the old system, which encouraged superficial knowledge by requiring candidates to answer one question at least out of certain